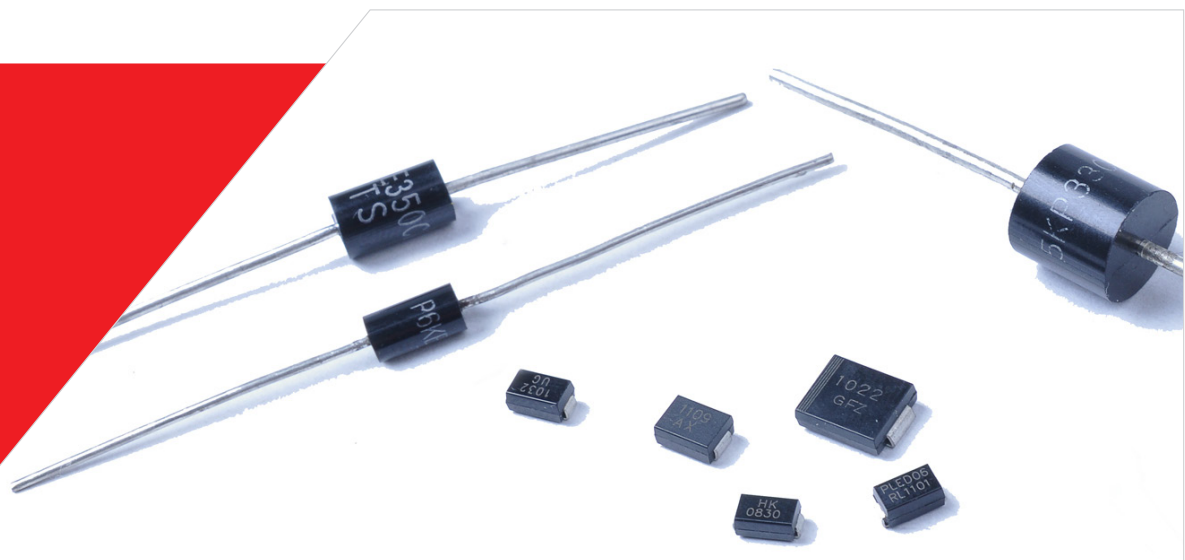


ELECTRONICS



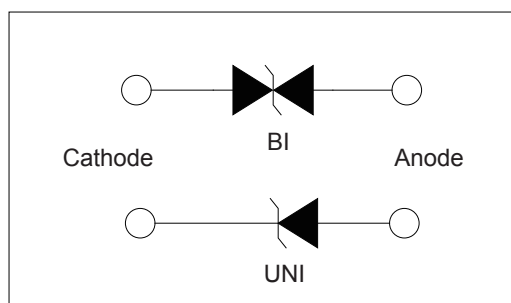
# Transient Voltage Suppressors

**SMCJ Series**

# Transient Voltage Suppressors - SMCJ Series

## Features

1. Halogen-free
2. Rohs compliant
3. Typical maximum temperature coefficient
4.  $\Delta V_{BR} = 0.1\% \times V_{BR}@25^{\circ}\text{C} \times \Delta T$
5. Glass passivated Chip junction in DO-214AB package
6. 1500W peak pulse capability at 10×1000μs waveform, repetition rate (duty cycles):0.01%
7. Fast response time:typically less than 1.0ps from 0 Volts to BV min
8. Excellent clamping capability
9. Low incremental surge resistance
10. Typical IR less than 5μA above 12V
11. High temperature soldering guaranteed: 260°C/40 seconds / 0.375",
12. (9.5mm) lead length, 5lbs., (2.3kg) tension
13. Plastic package has underwriters laboratory flammability classification 94v-0



## Applications

TVS devices are ideal for the protection of I/O interfaces,VCC bus and other vulnerable circuits used in telecom, computer, industrial and consumer electronic applications.

## Mechanical Characteristics

| Rating                                                                                  | Symbol         | Value          | Units |
|-----------------------------------------------------------------------------------------|----------------|----------------|-------|
| Peak Pulse Power Dissipation at TA=25°C by 10x1000μs waveform (Fig.1)(Note 1), (Note 2) | $P_{PPM}$      | 1500           | Watts |
| Power Dissipation on infinite heat sink at TA=50°C                                      | $P_D$          | 6.5            | Watts |
| Peak Forward Surge Current, 8.3ms Single Half Sine Wave (Note 3)                        | $I_{FSM}$      | 200            | Amps  |
| Maximum Instantaneous Forward Voltage at 25A for Unidirectional only (Note 4)           | $V_F$          | 3.5V/5.0       | V     |
| Operating junction and Storage Temperature Range.                                       | $T_J, T_{STG}$ | -55°C to 150°C | °C    |
| Typical Thermal Resistance Junction to Lead                                             | $R_{uJL}$      | 15             | °C/W  |
| Typical Thermal Resistance Junction to Ambient                                          | $R_{uJA}$      | 75             | °C/W  |

Notes:

1. Non-repetitive current pulse , per Fig. 3 and derated above TA = 25°C per Fig. 2.
2. Measured on 8.3ms single half sine wave or equivalent square wave, duty cycle=4 perminute maximum.
3.  $V_F < 3.5V$  for devices of  $V_{BR} < 200V$  and  $V_F < 5.0V$  for devices of  $V_{BR} > 201V$ .

## Electrical Characteristics

| Type Number |           | Device Marking Code |     | Reverse Stand-Off Voltage | Breakdown Voltage@I <sub>T</sub> |                         | Test Current        | Maximum Clamping Voltage@I <sub>PP</sub> | Peak Pulse Current  | Reverse Leakage @V <sub>RWM</sub> |
|-------------|-----------|---------------------|-----|---------------------------|----------------------------------|-------------------------|---------------------|------------------------------------------|---------------------|-----------------------------------|
| (UNI)       | (BI)      | UNI                 | BI  | V <sub>RWM</sub> (V)      | V <sub>BR</sub> MIN.(V)          | V <sub>BR</sub> MAX.(V) | I <sub>T</sub> (mA) | V <sub>C</sub> (V)                       | I <sub>PP</sub> (A) | I <sub>R</sub> (μA)               |
| SMCJ5.0A    | SMCJ5.0CA | GDE                 | BDE | 5.0                       | 6.40                             | 7.25                    | 10                  | 9.2                                      | 163.0               | 800                               |
| SMCJ6.0A    | SMCJ6.0CA | GDG                 | BDG | 6.0                       | 6.67                             | 7.67                    | 10                  | 10.3                                     | 145.7               | 800                               |
| SMCJ6.5A    | SMCJ6.5CA | GDK                 | BDK | 6.5                       | 7.22                             | 8.30                    | 10                  | 11.2                                     | 134.0               | 500                               |
| SMCJ7.0A    | SMCJ7.0CA | GDM                 | BDM | 7.0                       | 7.78                             | 8.95                    | 10                  | 12.0                                     | 125.0               | 200                               |
| SMCJ7.5A    | SMCJ7.5CA | GDP                 | BDP | 7.5                       | 8.33                             | 9.58                    | 1                   | 12.9                                     | 116.3               | 100                               |
| SMCJ8.0A    | SMCJ8.0CA | GDR                 | BDR | 8.0                       | 8.89                             | 10.23                   | 1                   | 13.6                                     | 110.3               | 50                                |
| SMCJ8.5A    | SMCJ8.5CA | GDT                 | BDT | 8.5                       | 9.44                             | 10.82                   | 1                   | 14.4                                     | 104.2               | 20                                |
| SMCJ9.0A    | SMCJ9.0CA | GDV                 | BDV | 9.0                       | 10.00                            | 11.50                   | 1                   | 15.4                                     | 97.4                | 10                                |
| SMCJ10A     | SMCJ10CA  | GDX                 | BDX | 10.0                      | 11.10                            | 12.80                   | 1                   | 17.0                                     | 88.3                | 5                                 |
| SMCJ11A     | SMCJ11CA  | GDZ                 | BDZ | 11.0                      | 12.20                            | 14.00                   | 1                   | 18.2                                     | 82.5                | 5                                 |
| SMCJ12A     | SMCJ12CA  | GEE                 | BEE | 12.0                      | 13.30                            | 15.30                   | 1                   | 19.9                                     | 75.4                | 5                                 |
| SMCJ13A     | SMCJ13CA  | GEG                 | BEG | 13.0                      | 14.40                            | 16.50                   | 1                   | 21.5                                     | 69.8                | 5                                 |
| SMCJ14A     | SMCJ14CA  | GEK                 | BEK | 14.0                      | 15.60                            | 17.90                   | 1                   | 23.2                                     | 64.7                | 5                                 |
| SMCJ15A     | SMCJ15CA  | GEM                 | BEM | 15.0                      | 16.70                            | 19.20                   | 1                   | 24.4                                     | 61.5                | 5                                 |
| SMCJ16A     | SMCJ16CA  | GEP                 | BEP | 16.0                      | 17.80                            | 20.50                   | 1                   | 26.0                                     | 57.7                | 5                                 |
| SMCJ17A     | SMCJ17CA  | GER                 | BER | 17.0                      | 18.90                            | 21.70                   | 1                   | 27.6                                     | 54.4                | 5                                 |
| SMCJ18A     | SMCJ18CA  | GET                 | BET | 18.0                      | 20.00                            | 23.30                   | 1                   | 29.2                                     | 51.4                | 5                                 |
| SMCJ20A     | SMCJ20CA  | GEV                 | BEV | 20.0                      | 22.20                            | 25.50                   | 1                   | 32.4                                     | 46.3                | 5                                 |
| SMCJ22A     | SMCJ22CA  | GEX                 | BEX | 22.0                      | 24.40                            | 28.00                   | 1                   | 35.5                                     | 42.3                | 5                                 |
| SMCJ24A     | SMCJ24CA  | GEZ                 | BEZ | 24.0                      | 26.70                            | 30.70                   | 1                   | 38.9                                     | 38.6                | 5                                 |
| SMCJ26A     | SMCJ26CA  | GFE                 | BFE | 26.0                      | 28.90                            | 33.20                   | 1                   | 42.1                                     | 35.7                | 5                                 |
| SMCJ28A     | SMCJ28CA  | GFG                 | BFG | 28.0                      | 31.10                            | 35.80                   | 1                   | 45.4                                     | 33.1                | 5                                 |
| SMCJ30A     | SMCJ30CA  | GFK                 | BFK | 30.0                      | 33.30                            | 38.30                   | 1                   | 48.4                                     | 31.0                | 5                                 |
| SMCJ33A     | SMCJ33CA  | GFM                 | BFM | 33.0                      | 36.70                            | 42.20                   | 1                   | 53.3                                     | 28.2                | 5                                 |
| SMCJ36A     | SMCJ36CA  | GFP                 | BFP | 36.0                      | 40.00                            | 46.00                   | 1                   | 58.1                                     | 25.9                | 5                                 |
| SMCJ40A     | SMCJ40CA  | GFR                 | BFR | 40.0                      | 44.40                            | 51.10                   | 1                   | 64.5                                     | 23.3                | 5                                 |
| SMCJ43A     | SMCJ43CA  | GFT                 | BFT | 43.0                      | 47.80                            | 54.90                   | 1                   | 69.4                                     | 21.7                | 5                                 |
| SMCJ45A     | SMCJ45CA  | GFV                 | BFV | 45.0                      | 50.00                            | 57.50                   | 1                   | 72.7                                     | 20.6                | 5                                 |
| SMCJ48A     | SMCJ48CA  | GJT                 | BJT | 48.0                      | 53.30                            | 61.30                   | 1                   | 77.4                                     | 19.4                | 5                                 |
| SMCJ51A     | SMCJ51CA  | GJV                 | BJV | 51.0                      | 56.70                            | 65.20                   | 1                   | 82.4                                     | 18.2                | 5                                 |
| SMCJ54A     | SMCJ54CA  | GFX                 | BFX | 54.0                      | 60.00                            | 69.00                   | 1                   | 87.1                                     | 17.3                | 5                                 |
| SMCJ58A     | SMCJ58CA  | GFZ                 | BFZ | 58.0                      | 64.40                            | 74.10                   | 1                   | 93.6                                     | 16.1                | 5                                 |
| SMCJ60A     | SMCJ60CA  | GGE                 | BGE | 60.0                      | 66.70                            | 76.70                   | 1                   | 96.8                                     | 15.5                | 5                                 |
| SMCJ64A     | SMCJ64CA  | GGG                 | BGG | 64.0                      | 71.10                            | 81.80                   | 1                   | 103.0                                    | 14.6                | 5                                 |
| SMCJ70A     | SMCJ70CA  | GGK                 | BGK | 70.0                      | 77.80                            | 89.50                   | 1                   | 113.0                                    | 13.3                | 5                                 |
| SMCJ75A     | SMCJ75CA  | GGM                 | BGM | 75.0                      | 83.30                            | 95.80                   | 1                   | 121.0                                    | 12.4                | 5                                 |
| SMCJ78A     | SMCJ78CA  | GGP                 | BGP | 78.0                      | 86.70                            | 99.70                   | 1                   | 126.0                                    | 11.9                | 5                                 |
| SMCJ85A     | SMCJ85CA  | GGR                 | BGR | 85.0                      | 94.40                            | 108.20                  | 1                   | 137.0                                    | 11.0                | 5                                 |
| SMCJ90A     | SMCJ90CA  | GGT                 | BGT | 90.0                      | 100.00                           | 115.50                  | 1                   | 146.0                                    | 10.3                | 5                                 |
| SMCJ100A    | SMCJ100CA | GGV                 | BGV | 100.0                     | 111.00                           | 128.00                  | 1                   | 162.0                                    | 9.3                 | 5                                 |
| SMCJ110A    | SMCJ110CA | GGX                 | BGX | 110.0                     | 122.00                           | 140.50                  | 1                   | 177.0                                    | 8.5                 | 5                                 |
| SMCJ120A    | SMCJ120CA | GGZ                 | BGZ | 120.0                     | 133.00                           | 153.00                  | 1                   | 193.0                                    | 7.8                 | 5                                 |
| SMCJ130A    | SMCJ130CA | GHE                 | BHK | 130.0                     | 144.00                           | 165.50                  | 1                   | 209.0                                    | 7.2                 | 5                                 |
| SMCJ150A    | SMCJ150CA | GHG                 | BHG | 150.0                     | 167.00                           | 192.60                  | 1                   | 243.0                                    | 6.2                 | 5                                 |
| SMCJ160A    | SMCJ160CA | GHK                 | BHK | 160.0                     | 178.00                           | 197.00                  | 1                   | 259.0                                    | 5.8                 | 5                                 |
| SMCJ170A    | SMCJ170CA | GHM                 | BHM | 170.0                     | 189.00                           | 209.00                  | 1                   | 275.0                                    | 5.5                 | 5                                 |
| SMCJ180A    | SMCJ180CA | GHP                 | BHP | 180.0                     | 198.00                           | 222.00                  | 1                   | 292.0                                    | 5.1                 | 5                                 |
| SMCJ190A    | SMCJ190CA | GHR                 | BHR | 190.0                     | 209.00                           | 243.20                  | 1                   | 308.0                                    | 4.8                 | 5                                 |
| SMCJ200A    | SMCJ200CA | GHX                 | BHX | 200.0                     | 220.00                           | 247.00                  | 1                   | 324.0                                    | 4.6                 | 5                                 |
| SMCJ220A    | SMCJ220CA | GJE                 | BJE | 220.0                     | 242.00                           | 272.00                  | 1                   | 356.0                                    | 4.2                 | 5                                 |
| SMCJ250A    | SMCJ250CA | GJG                 | BJG | 250.0                     | 279.00                           | 309.00                  | 1                   | 405.0                                    | 3.7                 | 5                                 |
| SMCJ300A    | SMCJ300CA | GJK                 | BJK | 300.0                     | 335.00                           | 371.00                  | 1                   | 486.0                                    | 3.1                 | 5                                 |

# Transient Voltage Suppressors - SMCJ Series

## Ratings and Characteristic Curves

Figure 1 - Peak Pulse Power Rating

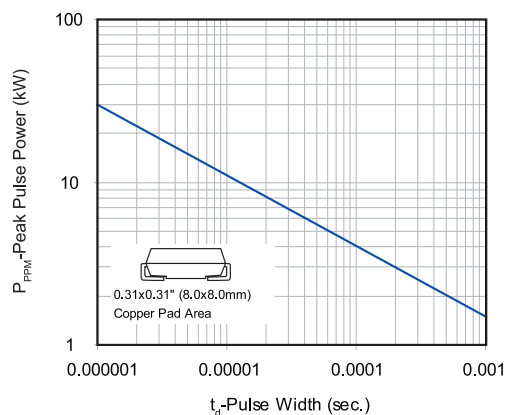


Figure 2 - Pulse Derating Curve

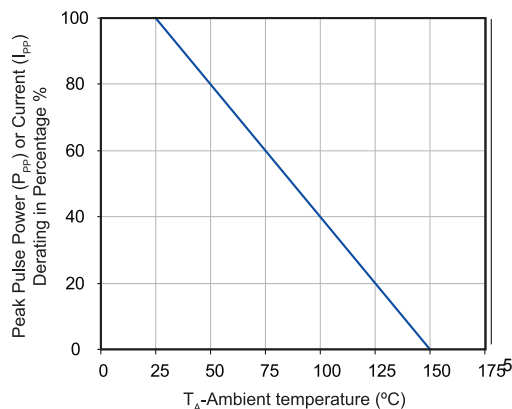


Figure 3 - Pulse Waveform

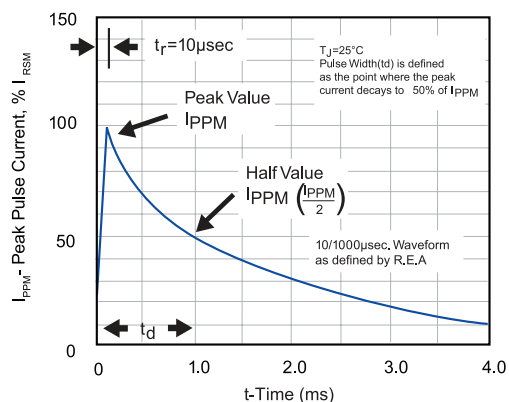


Figure 4 - Typical Junction Capacitance

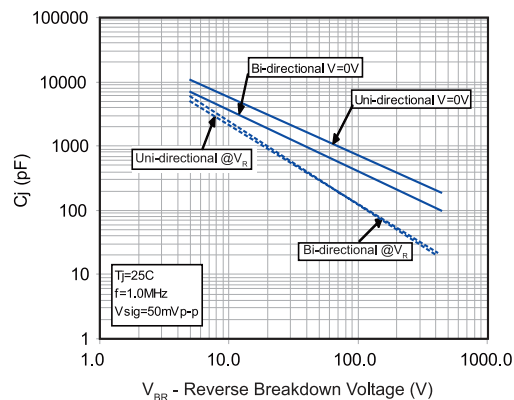


Figure 5 - Steady State Power Derating Curve

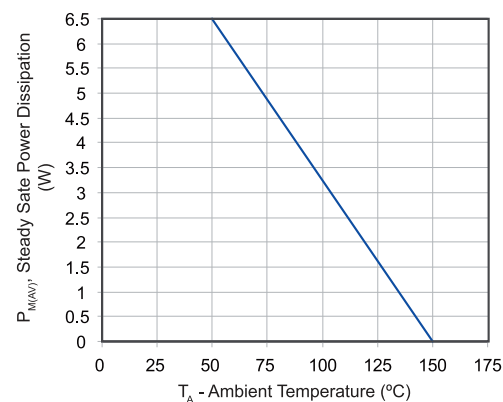
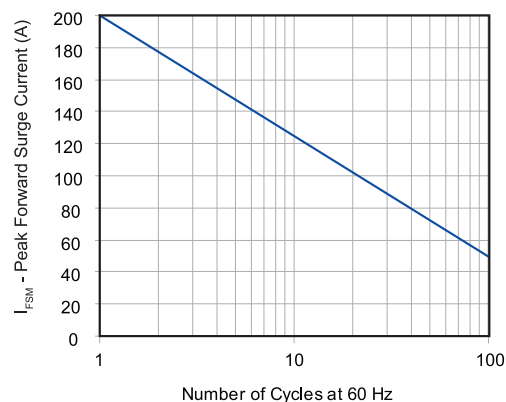


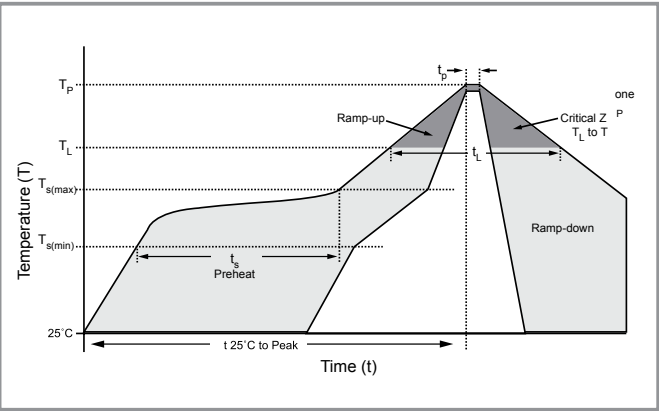
Figure 6 - Maximum Non-Repetitive Peak Forward Surge Current Uni-Directional Only



# Transient Voltage Suppressors - SMCJ Series

## Soldering Parameters

|                                                       | Reflow Condition                   | Lead-free assembly      |
|-------------------------------------------------------|------------------------------------|-------------------------|
| Pre Heat                                              | - Temperature Min ( $T_{s(min)}$ ) | 150°C                   |
|                                                       | - Temperature Max ( $T_{s(max)}$ ) | 200°C                   |
|                                                       | - Time (min to max) ( $t_s$ )      | 60-180 secs             |
| Average ramp up rate (Liquidus Temp ( $T_L$ ) to peak |                                    | 3°C/second max          |
| $T_{s(max)}$ to $T_L$ - Ramp-up Rate                  |                                    | 3°C/second max          |
| Reflow                                                | - Temperature ( $T_L$ ) (Liquidus) | 217°C                   |
|                                                       | - Time (min to max) ( $t_s$ )      | 60-150 seconds          |
| Peak Temperature ( $T_p$ )                            |                                    | 260 <sup>+0/-5</sup> °C |
| Time within 5°C of actual peak Temperature ( $t_p$ )  |                                    | 20-40 seconds           |
| Ramp-down Rate                                        |                                    | 6°C/second max          |
| Time 25°C to peak Temperature ( $T_p$ )               |                                    | 8 minutes Max.          |
| Do not exceed                                         |                                    | 280°C                   |



## Physical Specifications

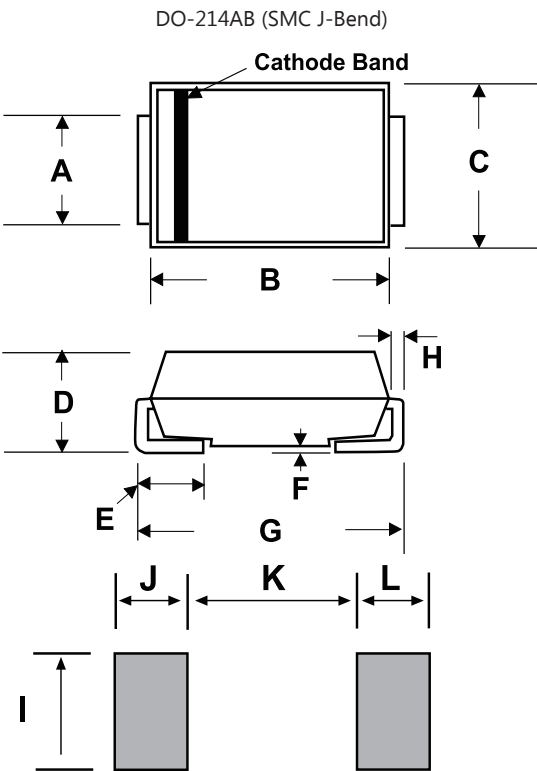
|           |                                                                   |
|-----------|-------------------------------------------------------------------|
| Weight    | 0.007 ounce, 0.21 grams                                           |
| Case      | JEDEC DO214AA. Molded plastic body over glass passivated junction |
| Polarity  | Color band denotes cathode except Bidirectional.                  |
| Terminals | Matte Tin-plated leads, Solderable per JESD22-B102D               |

## Environmental Specifications

|                    |              |
|--------------------|--------------|
| Temperature Cycle  | JESD22-A104  |
| Pressure Cooker    | JESD 22-A102 |
| High Temp. Storage | JESD22-A103  |
| HTRB               | JESD22-A108  |
| Thermal Shock      | JESD22-A106  |

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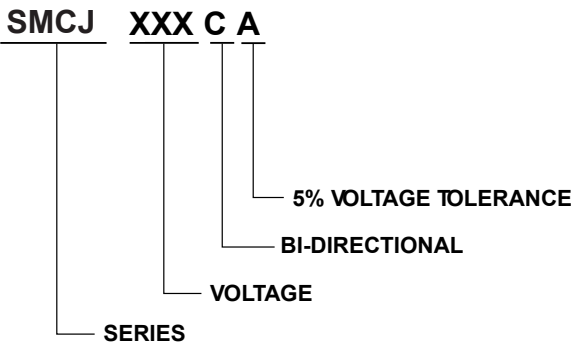
## Dimensions



Unit:mm

| DIM | Inches |       | Millimeters |       |
|-----|--------|-------|-------------|-------|
|     | Min    | Max   | Min         | Max   |
| A   | 0.114  | 0.126 | 2.900       | 3.200 |
| B   | 0.260  | 0.280 | 6.600       | 7.110 |
| C   | 0.220  | 0.245 | 5.590       | 6.220 |
| D   | 0.079  | 0.103 | 2.060       | 2.620 |
| E   | 0.030  | 0.060 | 0.760       | 1.520 |
| F   | -      | 0.008 | -           | 0.203 |
| G   | 0.305  | 0.320 | 7.750       | 8.130 |
| H   | 0.006  | 0.012 | 0.152       | 0.305 |
| I   | 0.129  | -     | 3.300       | -     |
| J   | 0.094  | -     | 24.00       | -     |
| K   | -      | 0.165 | -           | 4.200 |
| L   | 0.094  | -     | 2.400       | -     |

## Part Numbering System



## Packaging

| Part Number | Component Package | Quantity | Packaging Option         | Packaging Specification |
|-------------|-------------------|----------|--------------------------|-------------------------|
| SMCJxxxXX   | DO-214AB          | 500      | Tape & Reel-16mm/13"tape | EIA STD RS-481          |